

# PATENT SPECIFICATION



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161,998

Complete Left: July 5, 1920.

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## PROVISIONAL SPECIFICATION.

### Improvements in Gravity Ways for the Conveyance of Parcels and other Goods.

I, JOHN HENRY DOHERTY, of "South View", High Holme Road, Louth, in the County of Lincoln, Post Master, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in gravity ways for the conveyance of parcels and other goods and whilst specially designed for use in large post offices for the conveyance of mail packets in bulk as parcels, newspaper packets and the like from the general sorting department to territorial stations in which further sorting takes place it is likewise applicable in connection with the conveyance of goods in general from one point to another, the object being to provide a gravity way in which a carriage can be loaded on a low level, hoisted up to the track sent along the latter to its destination, automatically discharged of its contents and then returned to the starting point to be re-loaded, all without the exercise of hand labour except in the loading of the carriage and the hoisting of it to the track, though where heavy goods are being dealt with the hand hoisting may be replaced by a power-operated hoist.

With the aforesaid objects in view my invention comprises a carriage to receive the goods, provided with a hinged bottom and end fitted with suitable catches for holding them in place whilst loaded, the bottom being hinged at a point beyond one end or side so that there is no possibility of any goods being left in the carriage when discharging. One end of the carriage is fitted with a pivoted counterweighted arm, the lower end of which acts as a catch to secure it in position whilst the carriage is loaded. The

arm is arranged to come in contact with a fixed arm or part where discharge is to take place to release the catch and allow the end and bottom of the carriage to swing open. The bottom of the carriage is held in position by a tumbler catch on the hinged end of the carriage. The bottom is also counter-weighted so that it will close automatically when the load is discharged and become engaged with the hinged end of the carriage just after the latter has returned to its normal position and become fixed. The carriage is fitted with upstanding and overhanging arms carrying grooved rollers or wheels by which the carriage is supported upon the gravity track.

To enable the loaded carriage to be lifted from a lower to a higher level it is run on to a receiving frame mounted upon vertical guides and connected with any suitable form of hand or power-operated hoisting means, such frame being so arranged that the loaded carriage depresses it at the rear end to retain the carriage in position whilst being hoisted. For this purpose the frame is fitted with a link and lever mechanism either controlled by a spring or by a counter-weighted lever. When the frame is brought to a position opposite the forward line of gravity track it is tilted forward against the influence of the spring or weight by coming into contact with a fixed part of the main framework so inclining the supporting rails of the frame as to discharge the carriage on to the track.

The track is composed of an upper and lower single rail, the former being the forward one and the latter the return.

[Price 1/-]

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Both tracks are suitably supported upon standards or slings from above. The forward track on to which the carriage is discharged is generally declined from the starting to the discharge point but in such a way that no great impetus is created in the load. It and the return track may be of any suitable length depending upon the service required. Near its discharge end a portion of the top track is pivoted to the fixed part and its free end normally raised above the remainder of the track by a spring or counterweight. When the carriage reaches this pivoted portion it forces its free end down into contact with the lower track and finally discharges its load into a shute or receptacle or otherwise by the releasing arm on the end of the carriage striking a fixed part of the structure. After the carriage has passed, as aforesaid, the pivoted portion of the track rises to allow the carriage to return to its starting point along the lower track which is declined from the discharge point to the starting point. In the meantime the hoist frame has descended from opposite

the upper track into line with the lower track ready to receive the empty carriage. The frame, however, has meantime been held in the lower position by projecting arms engaging with the fixed structure, such arms being connected with the tilting mechanism of the frame. When the carriage comes on to the frame, the latter is depressed so disengaging the arms referred to and allowing it to descend to the low loading level along with the carriage. The hoist frame is partly counterbalanced by weights connected with the hoisting mechanism.

The discharge shute previously referred to may in some cases be fitted internally with a pivoted door to hold the load within it, such door being released to discharge the load from the shute by a hand or foot lever and link mechanism.

Dated this 30th day of August, 1919.

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## COMPLETE SPECIFICATION.

### Improvements in Gravity Ways for the Conveyance of Parcels and other Goods.

I, JOHN HENRY DOHERTY, of "South View", High Holme Road, Louth, in the County of Lincoln, Post Master, British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in gravity ways for the conveyance of parcels and other goods and whilst specially designed for use in large post offices for the conveyance of mail packets in bulk, such as parcels, newspaper packets and the like from the general sorting department to territorial stations in which further sorting takes place it is likewise applicable in connection with the conveyance of goods in general from one point to another, the object being to provide a gravity way in which a carriage can be loaded on a low level, hoisted up to the track sent along the latter to its destination, automatically discharged of its contents and then returned to the starting point to be re-loaded, all without the exercise of hand labour except in the load-

ing of the carriage and the hoisting of it to the track, though where heavy goods are being dealt with the hand hoisting may be replaced by a power-operated hoist.

In carrying my invention into effect I provide a forward gravity track and a return gravity track merging into one at the unloading end which is slightly inclined, with a carriage to contain in the packages or receptacles to be forwarded, part of the forward track being normally held in the raised position by springs or counterweights and adapted to be depressed to the level of the rest of the forward track by the weight of the carriage on its forward journey, and to rise again after the latter has passed, thus allowing the carriage to take the return track on its return journey. A hoist is provided for the carriage to hoist it to the starting point of the forward track, such frame carrying a section of rail on which the carriage runners fit, and means for ensuring that the carriage and rail section shall assume an inclined position with the frame whilst the latter

is being raised with the carriage to keep the latter in position.

Means hereinafter described are also provided for automatically bringing the hoist and its attached section of track opposite the end of the return track and retaining them there until the hoist receives the empty carriage, and for automatically opening the goods carriage to discharge its contents and for closing it again before it starts its return journey.

It has been proposed to provide switch gear to turn a "carrier" from a forward gravity track to a return gravity track, and also to provide a forward and return track merging into one at the discharge end which was slightly inclined, the switch being worked automatically by apparatus borne by the carriage. It has also been proposed to provide at the end of a return track a section of rail pivoted and adapted to be inclined when a "carrier" ran on to it to retain the latter in position. I make no claim to such devices.

The present invention will be fully described with reference to the accompanying drawings in which,

Fig. 1, is a side elevation of the complete apparatus.

Fig. 2, sectional end elevation on the line "B. B." of Fig. 3.

Fig. 3, plan of apparatus.

Fig. 4, sectional elevation to an enlarged scale along the lines "C. C." Fig. 5 showing detail of the lifting carriage and truck, or carriage and its trip gear.

Fig. 5, front elevation of lifting carriage.

Fig. 6, separate side elevation and part plan of movable rail and its gear.

Fig. 7, transverse section of track on line "A. A." of Fig. 1 and

Fig. 8, front elevation, plan and side elevation respectively of carrier, or truck

With the aforesaid objects in view my invention comprises a carriage *a* usually of box-like form, to receive the goods, provided with a hinged bottom *b* and an end *c* fitted with suitable catches for holding them in place whilst loaded, the bottom *b* being hinged to the carriage body at a point *d* beyond one end or side so that there is no possibility of any goods being left in the carriage when discharging. One end *e* of the carriage is hinged to the latter at *e* and is fitted with a counterweighted arm *f* pivoted at *g* the lower end or cross bar *h* of which acts as a catch *i* on side *g* to secure it in position during the time the carriage is loading and carrying its load. The upper end

*k* of arm *f* is arranged to come in contact first with an inclined bar *m* to move it about its pivot *g* sideways to disengage it from the catch *i* fixed to the carriage side and then with a fixed arm or bar *m*<sup>1</sup> at the point where discharge is to take place, to release the catch and allow both the end and bottom of the carriage to swing open. The free end of the bottom *b* of the carriage is held in position by a tumbler catch *n* passing thereunder as shown in full lines in Fig. 8. The bottom is also counterweighted so that it will close automatically when the load is discharged and become engaged with the tumbler catch *n* of the carriage. The counterweighting device consists of a lever *o* pivoted to the side of the carriage at *p*. This lever carries an adjustable weight *q* at one end whilst its other end is coupled by links *r* to the underside of the bottom near its pivotal point. The action of the parts is as follows:--When the upper end of arm *f* strikes the inclined bar *m* it is pushed on one side to disengage cross bar *h* from catch *i*. Immediately afterwards arm *f* contacts with bar *m*<sup>1</sup> and draws end *c* from beneath the bottom *b*, the end *c* turning about its pivotal points at the same time. The weight of the goods in the carriage then forces the bottom open against the influence of the counterweight, allowing the goods to discharge freely into a chute or receptacle through guards. The carriage is then free to make the return journey but as it commences to move the bottom is returned to the closed position by the counterweight, the end *c* returning to normal immediately before. The lower end of arm *f* at this time engages with catch *i* by being pushed aside by the latter about its pivot *g* so as to afterwards drop behind the catch.

The carriage is fitted with upstanding and overhanging arms *t* and *u* carrying grooved rollers or wheels *v* by which the carriage is supported upon the gravity track.

To enable the loaded carriage *a* to be lifted from a lower to a higher level as from one floor to another it is run from the lower floor on to a short length of track *5* fitted to a bracket pivoted on a receiving frame *w* mounted upon vertical guides or standards *x* and connected by cables *y* to any suitable form of hand or power-operated hoisting means *2*, such frame being so arranged that the loaded carriage depresses track *5* at the rear end to retain the carriage in position whilst being hoisted. For this purpose the frame is fitted with a link and lever mech-

anism either controlled by a spring or by a counterweighted lever. Thus in the arrangement shown in the drawings the hoisting frame *w* has pivoted to it at 3 another frame or lever 4. This latter is fixed to a bracket on frame *w* having an upstanding rear arm 6 coupled to the upper end of the said lever 4 by a link or stay 7 and to the upper end of frame *w* by a spring 8. A counterweighted lever may be employed in place of a spring. Normally track 5 is level as shown in broken lines at the lower part of Fig. 1, and in Fig. 4 but when the carriage is pushed on to short track 5, say from the broken line position at the lower part of Fig. 1, the track is depressed by the carriage and its load to the declined full line position shown in the upper part of Fig. 1, or to the declined broken line position in Fig. 4. The carriage rests against the rear arm 6 and in the position stated loads the spring or lifts the equivalent counterweight, to hold itself in position during hoisting. The frame *w* and its load is then ready for being raised to the top position by the hoisting gear. When the frame *w* is brought to the top position opposite the forward line 9 of the gravity track the short track 5 is tilted forward against the influence of the spring or weight by coming into contact with a fixed part of the main framework or the track 9 so inclining the supporting track 5 of the frame to discharge the carriage on to the main track 9.

The track is composed of an upper rail 9 and lower single rail 10 the former being the forward one and the latter the return. Both tracks are suitably supported upon standards 11, or slings 12 from above or by both. The forward track 9 on to which the carriage is discharged is generally declined from the starting to the discharge point at which latter position it is slightly inclined, but in such a way that no great impetus is created in the load. It and the return track 10 may be of any suitable length depending upon the service required. Near the discharge end the top track 9 is provided with a portion 13 pivoted to the fixed part of the track and its free end is normally raised above the remainder of the track by a spring or counterweight as shown by broken lines in Fig. 6. In Figs. 1 and 6 the part 13 is pivoted at 14 and has, in turn, an extension 15 coupled to it at 16, such extension being pivoted at 17 to the track frame. The track parts 13 and 15 are shown in the drawings as being normally

raised by means of a link 18, pivoted to the short arm of a counterweighted lever 19 which is itself pivoted to the track frame at 20. When the carriage reaches this pivoted portion of the track it forces its free end down into contact with the lower track as shown by full lines in Fig. 6 and finally discharges its load in the manner described into the shute or receptacle or otherwise. After the carriage has passed, the pivoted portion of the track rises to allow the carriage to return to its starting point along the lower track 10 which is declined from the discharge point to the starting point. In the meantime the hoist frame *w* has descended from opposite the upper track 9 into line with the lower track 10 ready to receive the empty carriage, said frame being held, when it reaches the lower position, by projecting arms 21 on frame 4 engaging stops 22 on the fixed standards. The frame *w* is connected by a chain or rope passing round pulley 24 with two weights 25 and 26. Both weights are guided on standards 27 the lower one 26 being actually coupled to the chain whilst the latter passes freely through weight 25, which can rest upon stops 28 on the standards 27 when the tilting frame is raised above track 10. In this latter case weight 26 nearly counterbalances the weight of the tilting and hoisting frames without the carriage, and it follows from this arrangement of separate weights that the hoisting frame can descend from rail 9 to rail 10, on its downward journey, by its own weight until weight 26 lifts weight 25 off its stops 28. The two weights together nearly counterbalance the two frames and the empty carriage when the latter is on the tilting frame. The arms 22 are an additional safeguard to prevent the hoist frame and carriage commencing their descent until the latter is in position. The weights nearly counterbalancing the parts referred to render it necessary to only employ sufficient power to lift little more than the load in the carriage. When the carriage passes on to the tilting frame again the latter is depressed as before so disengaging the arms referred to and allowing it to descend to the low loading level, along with the carriage.

The discharge shute previously referred to may in some cases be fitted internally with a pivoted door to hold the load within it, such door being released to discharge the load from the shute by a hand or foot lever and link mechanism.

Although the loading level is shown

above the ground line in Fig. 1 it may be on a level therewith, the hoist frame being arranged to descend into a well.

5 Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

10 1. In a gravity runway an upper track declining from the loading point to near the discharge end where it becomes inclined, said inclined end forming part of the return track, a second and lower track declining from near the discharge  
15 end of the first to the loading end, part of the forward track being normally raised by springs or a counterweight and adapted to be depressed by the weight of the track carriage to carry the latter to  
20 the discharge end and then to rise to allow said carriage to return on the lower track for reloading.

2. In a gravity runway having the features claimed in Claim 1, a hand or  
25 power-operated hoist frame at the loading end of the track provided with a short length of track adapted to be tilted to a declined position by the goods carriage being run on to it so as to hold said  
30 carriage in position during hoisting to the forward runway track, and to be lifted to a declining position when it reaches the latter to set it in motion along the track to the discharge end of the latter, said  
35 tilting track assuming the horizontal after load discharge and then, after the hoist has been relieved of the weight of the carriage, automatically descending with the hoist to a point opposite the return  
40 track to receive the unloaded carriage

prior to final descent to the loading point for re-loading.

3. In a gravity runway having the features claimed in Claim 2, the means  
45 for retaining the hoist and tilting track opposite the return track to receive the empty carriage comprising an arm or frame pivoted to the hoist frame and coupled to the tilting track and projections on the arm to engage with support-  
50 ing brackets on the hoist standards as the hoist descends, said projections being brought into engaging position on the loaded carriage passing the track and disengaged on the empty carriage  
55 passing on to the tilting track prior to the hoist descending to the loading point.

4. In a gravity runway having the features claimed in Claim 2, the combination with the hoist frame of separate  
60 weights connected to the hoist by a chain or rope and so arranged as to almost counterbalance the hoist frame with or without the empty goods carriage.

5. In a gravity runway having the features claimed in Claim 1, a goods  
65 carriage provided with a hinged end and bottom to allow of complete discharge of the goods and counterweighted catch devices for controlling the opening and  
70 closing of said parts together with means for operating the end and bottom at the discharge end of the track.

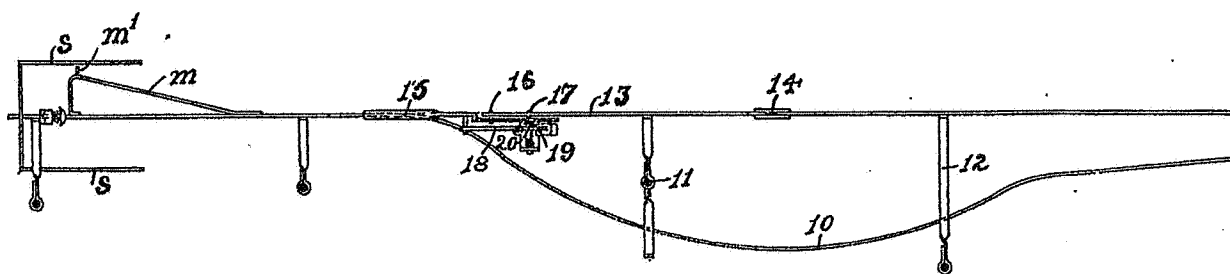
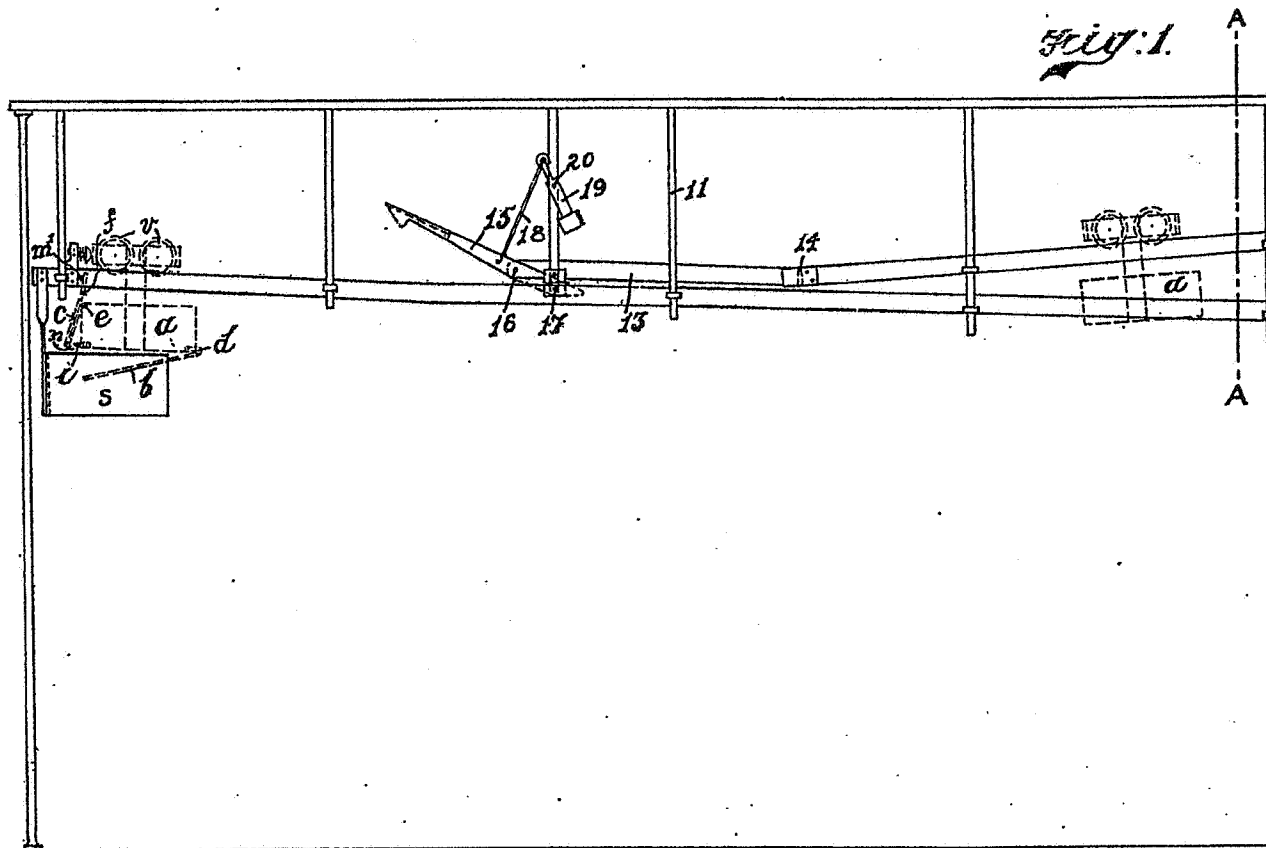
6. The gravity runway constructed and arranged as described with reference to  
75 the accompanying drawings.

Dated this 2nd day of July, 1920.

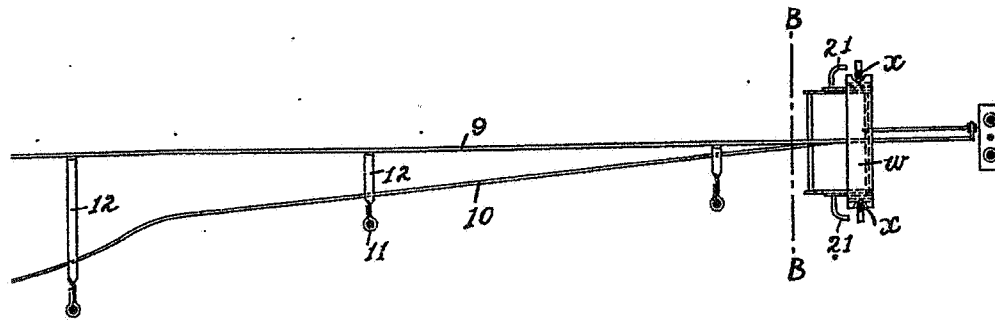
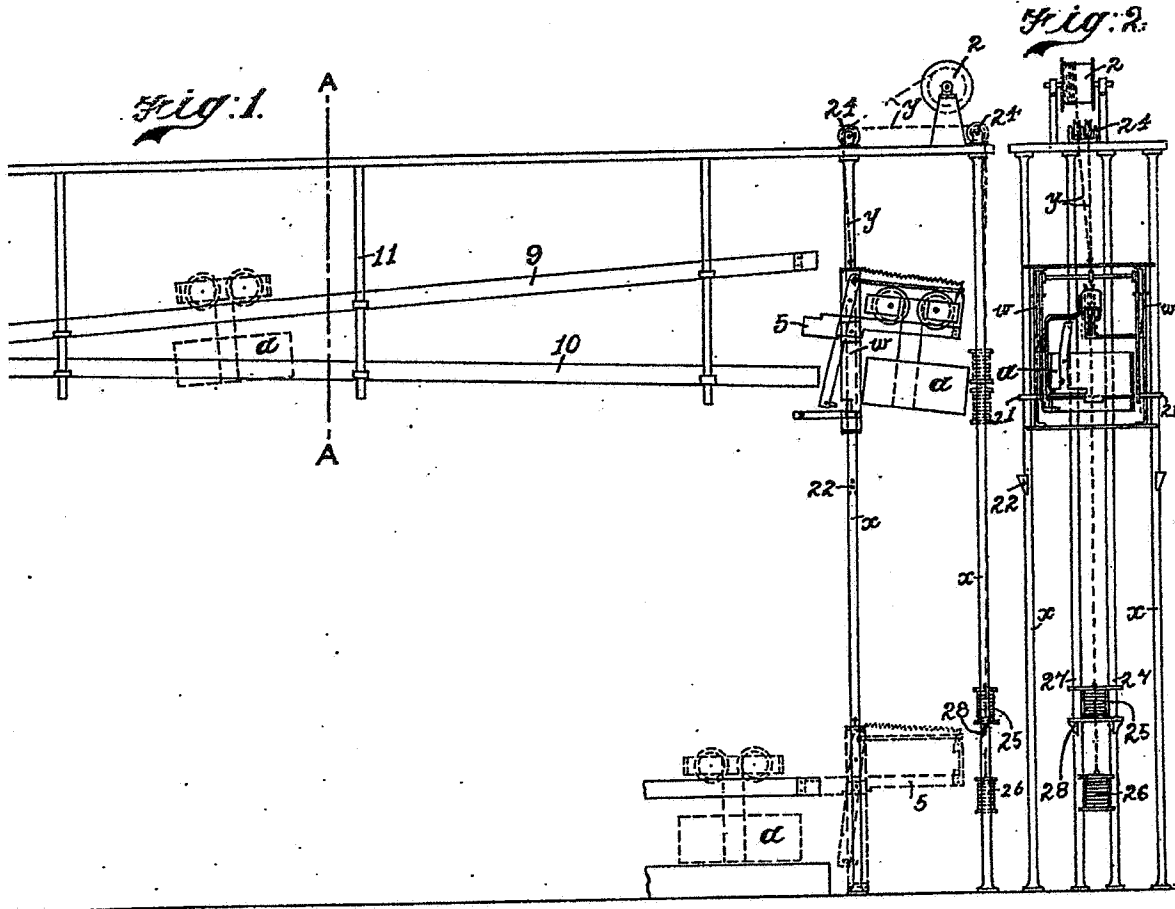
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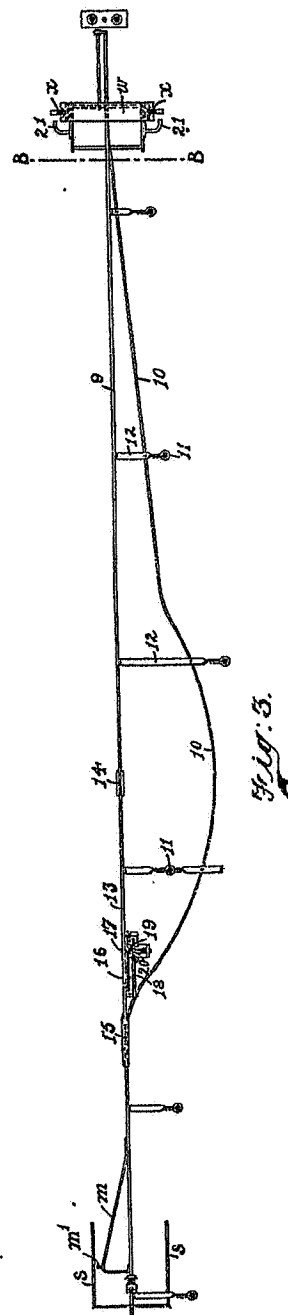
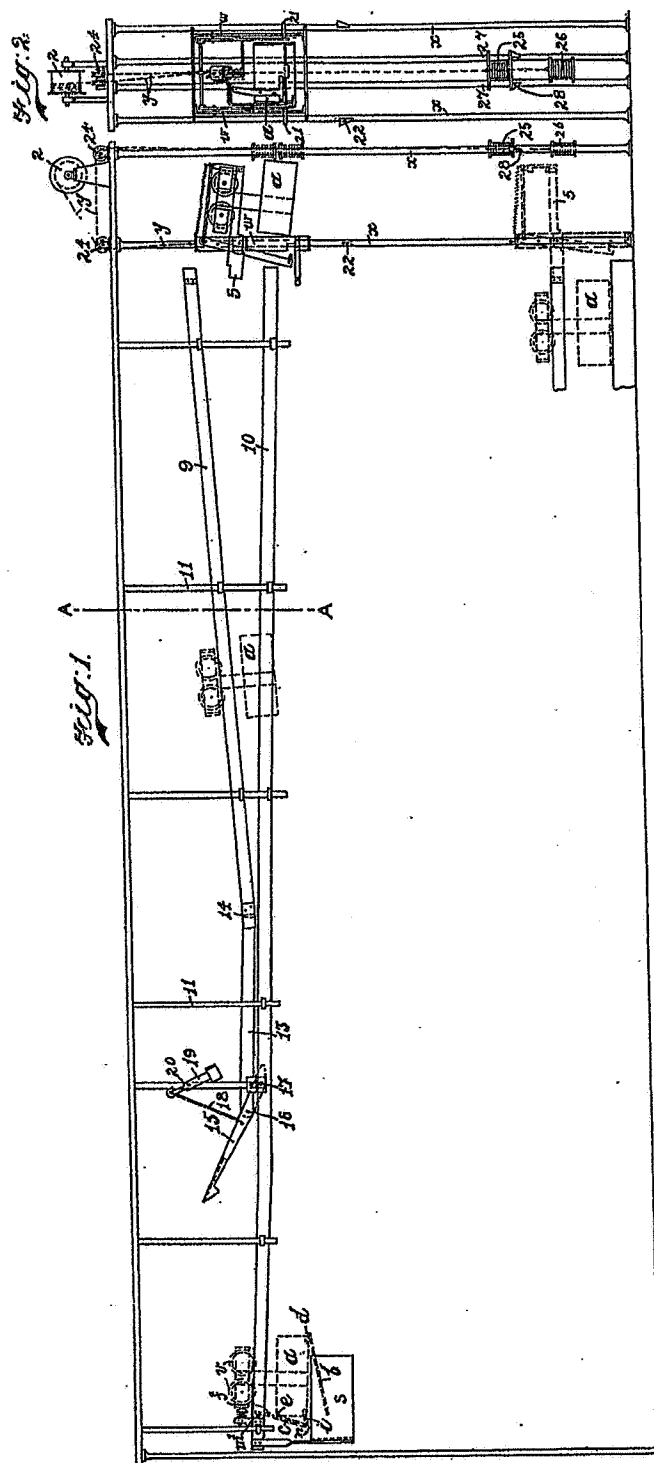
[This Drawing is a reproduction of the Original on a reduced scale]



*Fig: 3.*



[This Drawing is a reproduction of the Original on a reduced scale]





[This Drawing is a reproduction of the Original on a reduced scale.]

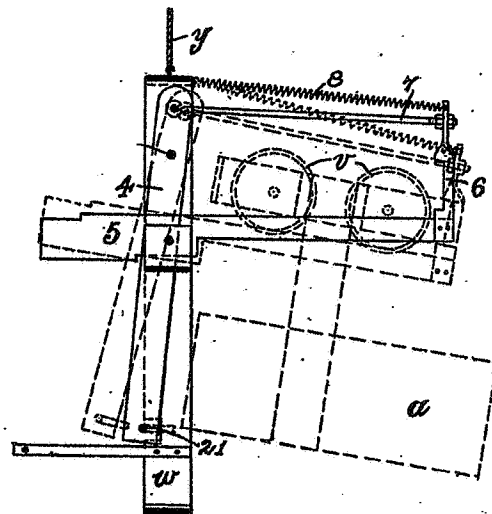


Fig. 4.

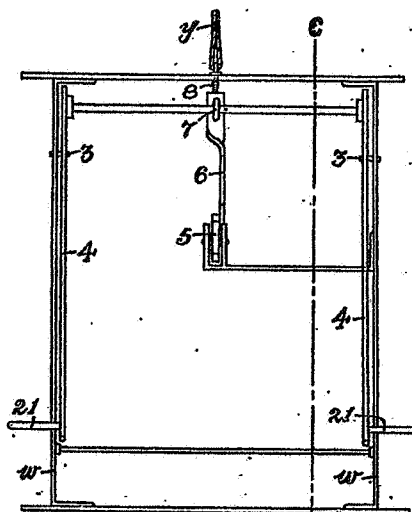


Fig. 5.

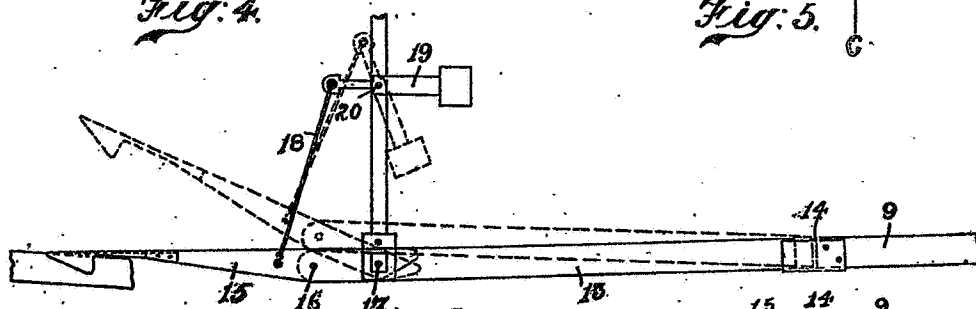


Fig. 6.

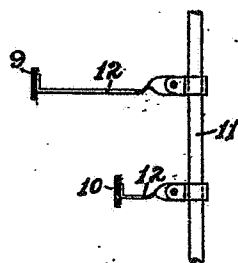


Fig. 7.

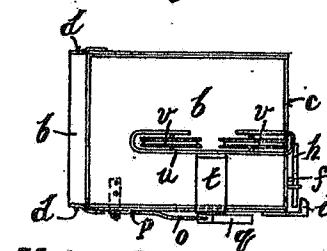
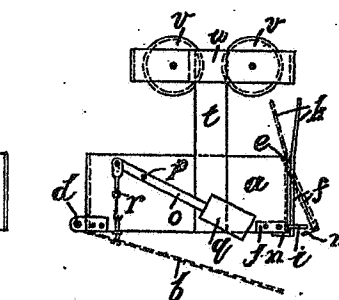
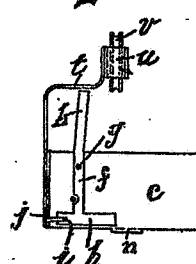


Fig. 8.